Partners in REPRODUCTION

A2 — Heat Stress

During the periods of high ambient temperature high producing dairy cows have particular trouble maintaining normal body temperature due to their extremely high metabolic rate. If such animals are not provided with the means to decrease their body temperature and modify the metabolism, their production and reproductive performance decrease.

Answering the questionnaire below will allow you to evaluate whether the measures you are taking during periods when heat stress is likely are sufficient to decrease its impact on reproductive function. If you maintain your animals inside during the hot season, answer the questions on this page. If you maintain your animals on pasture during the hot season, go to the next page.

Animals maintained indoors	Yes	No
Do you check that the water intake by the cows is sufficient?		
Is the temperature of the water maintained below 17C?		
Do you have at least one automatic drinker per 20 cows?		
Is the size of the drinking places large enough? (>65cm)		
Do you systematically start cooling procedures when the ambient temperature exceeds 25C?		
Do you remove/lift the side walls?		
Do you use water sprinklers?		
Do you use ventilation fans?		
Do you use any other cooling means?		

	Yes	No
Do you use a special Summer feeding ration?		
Do you feed your animals at least 2 times per day?		
Do you feed the animals about an hour before sunrise and after sunset?		
Are you increasing the potassium content to 1.3-1.5%, sodium to 0.5-0.6% and magnesium to 0.3-0.4%?		
Do you change/maintain the total crude protein content to below 18% and rumen degradable prote in content to less than 61% of the total CR?		
Is your fat supplement below 6% of the ration?		
Do you use additional vitamin supplementation?		

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Animals maintained on pasture	Yes	No
1. Do the cows have access to an artificial continuous flow source of water (automated drinking stations)?		
Go through the questions below only if answer to question 1 is Yes, otherwise go directly to question 5.		
2. Is the size of the drinking places large enough? (>65cm)		
3. Is the temperature of the water maintained below 17C?		
4. Do you provide at least 1 open through drinker per 20 cows?		
Go through the questions below only if answer to question 1 is No, otherwise go directly to question 9.		
5. Do you check and refill the water supply at least 2 times per day?		
6. Is the size of the drinking places large enough? (>65cm)		
7. Is the temperature of the water maintained below 17C?		
8. Do you check the quality (clean & cold) of water daily?		
9. Do you provide shaded area with a sufficient surface for all cows?		
10. Do you use any cooling means (sprinkling with water, water baths etc.)?		
11. Are you feeding based solely on pasture?		

	Yes	No
Go through the questions below only if answer to question 11 is No, otherwise go directly to question 19.		
12. Do you use a special summer feeding ration?		
13. Do you feed your animals at least 2 times per day?		
14. Do you feed the animals about an hour before sunrise and after sunset?		
15. Are you providing an additional supplement of sodium bicarbonate (150-200g/cow/day)?		
16. Are you increasing the potassium content to 1.3-1.5%, sodium to 0.5-0.6% and magnesium to 0.3-0.4%?		
17. Do you change/maintain the total crude protein content to below 18% and rumen degradable protein content to less than 61% of the total CR?		
18. Is your fat supplement below 6% of the ration?		
19. Do you use additional vitamin supplementation above the established norm?		

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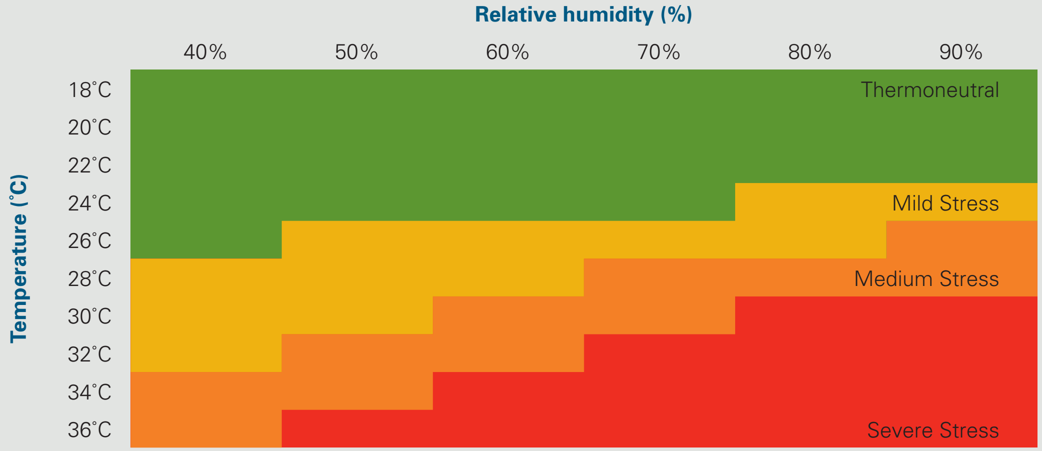
The bovine thermal comfort zone is -13C - +25C. Above 25C, (even 20C for some authors), the cow suffers from heat stress: its health status and zootechnical performance are affected.

How to evaluate heat stress

- Body temperature (rectal) > 39.4C
- Respiratory frequency >100/min
- DM intake decreases:
  - -10% = high stress
  - - 25% = severe stress
- Decrease in milk production



Modified from F. Wierama. University of Arizona. 1990

Always take both ambient temperature and humidity under consideration and use at least the estimated TH index to define the starting point for initiation of heat stress combating measures.

Heat stress minimizing measures should be implemented well before the effects on production and fertility are apparent.

References:
Rensis et al. Theriogenology 2003;60:1139-1151; Berman. J Dairy Sci 2011;94 :2147–2158

MSD Animal Health

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Although appropriate management and feeding adjustments will decrease the impact of heat stress on milk production and reproductive efficacy of dairy cows, you may want to consider certain changes to your reproductive management that can improve breeding management and results during the summer months.

More efficient breeding management

Focusing on breeding more heifers during the summer months may give better results as they are less vulnerable to the effects of heat stress.

One of the most important effects of heat stress in dairy cows is the increased occurrence of silent heat and a time shift with the majority of cows demonstrating heat during night hours.

Estrus synchronization with one of the programs allowing for a fixed time insemination would:

- Eliminate the necessity for estrus observation during hours inconvenient for personnel
- Prevent errors in heat detection caused by poor heat signs

Vet link to programs
(address: http://www.partners-in-reproduction.com/reproduction-cattle/heat-stress-pharmaceutical.asp)

Improvement of pregnancy rates

Delayed ovulation is often observed in high producing dairy cows exposed to heat stress leading to decreased fertilization rates and poorer embryo quality.

Induction of ovulation with GnRH administered during heat ensures that it takes place at adequate time in relation to breeding.

Vet link to programs
(address: http://www.partners-in-reproduction.com/reproduction-cattle/heat-stress-pharmaceutical.asp)

Introduction of **embryo transfer** as an element of reproduction management during periods of heat stress can overcome some of its effects especially if embryos produced by animals not exposed to heat stress are used.

References:
Cartmill et al. J Dairy Sci 2001; 84:799–806; Rensis et al. Theriogenology 2002;58:1675-1687; Kaim et al. J Dairy Sci 2003;86:2012-2021; Stewart et al. J Dairy Sci 2011;94 :3437–3445